First Progress Report

For the project entitled:

Inhibitor Longevity and Performance

Reporting Period: Jan. 28, 2008 – March 31, 2008

Prepared by

Laura Fay, M.Sc.

Research Scientist / Co-PI

and

Xianming Shi, Ph.D., PE

Research Scientist II / Principal Investigator

Western Transportation Institute (WTI)
College of Engineering
Montana State University – Bozeman

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Research Office
Washington State Department of Transportation
Transportation Building, MS 47372
Olympia, Washington 98504-7372

and the
Pacific Northwest Snowfighters Association
Transportation Pooled Fund TPF-5(035)

March 31, 2008

Task 0: Project Management

Weekly meetings were held between team members and the Principal Investigator. As a result of these meetings, experimental design, planning issues, laboratory methods, and items for the field investigation were discussed so that testing could begin in a timely manner. The project timeline was modified to reflect the holdup in the contract start date (now January 28, 2008 instead of Oct. 2007) and was submitted to the Steering Committee and Technical Advisory Committee.

Several new personnel have joined the team to assist with this project. Doug Cross, a research associate at WTI, joined the team to assist in the field design and testing. Additionally, one new undergraduate student was hired and will work with the team throughout the summer mainly on the Task 2: Laboratory Investigation.

Task 1: Experimental Design and Planning (70%)

Planning for Task 3.1

Task 3.1 has required planning and coordinating with the product manufacturers and suppliers to ensure receipt of the proper materials according the project specifications. One challenge has been trying to acquire small quantities of deicing products to suit the projects needs. Many of the suppliers work with government agencies where they ship the product using rail, whereas all of our orders only require a half to a full truck for shipment. This has led to some increased product cost because of the mode of transportation and elevated transportation costs.

One deicer vendor provided the product at no cost and we just paid shipping, two deicer vendors provided the product at cost plus shipping, and many other vendors provided the products at government discounted rates plus shipping.

The six 3000 gallon poly tanks were delivered in November 2007 and the burmed pad that holds them was constructed in February 2008. The tanks have been set up with pumps so that material in three of the tanks can be mixed once a week for one hour. The liquid products (Freezeguard CI plus, Geomelt C, and GLT & NA salt for brine) have been ordered and will be delivered this April.

Upon delivery a sample of each deicer product will be collected and sent to Ron Wright at Idaho Transportation Department for initial product testing. Samples will also be collected and brought back to WTI-MSU for Task 2 testing. The liquid sampling system (Van Dorn bottle) and collection bottles have been purchased.

The buildings for two of the pads will be constructed in April, after which the solid products (IceSlicer and salt-sand mixture with 10% salt by weight) will be delivered. Upon delivery a sample of each deicer product will collected and sent to Ron Wright for initial product testing. Samples will also be collected and brought back to WTI-MSU for Task 2 testing. The modified

sampling protocol developed with the TAC will involve collecting a five gallon bucket of solid material (instead of one pound) according to ASTM specifications and running the inhibitor detection test at least 3-5 times. This only deviates from the proposal in the quantity of product that is collected.

Figure 1. Photograph of the Transcend Test Facility (Lewistown, MT) with the constructed plastic lined gravel pads with the 6-3000 gallon liquid deicer tanks (March 24, 2008). The gravel pads in the foreground will house buildings with salt-sand and salt.

Figure 2. Photograph of the sloped plastic lined gravel pads at Transcend (March 24, 2008). This pad will hold 25 tons of salt-sand blend.

Planning for Task 3.2

Liquid and solid application equipment that would meet the needs of the project has been identified. We will use a liquid applicator with a stream nozzle. The liquid and solid applicators will be mounted on a tow trailer, both of which are designed for agricultural applications. The equipment allows us to apply small quantities (to be specified by the Steering Committee and TAC) of deicer products for the field operational tests, with precision in application rate. Testing of the liquid and solid application equipment will begin in April to ensure we can reproduce the application rate and recover the material applied.

Meetings with the project statistician and input from the Steering Committee and TAC members aided in the design of field sampling scheme, which was modified from the original proposal to address issues with sampling liquid and solid deicing products accurately, as well as capturing the small concentration of corrosion inhibitors in the products.

Transcend

We are working closely with the *Transcend* team at WTI (including Eli Cuelho, Michelle Akin, Jahson Harwood, and Dan Williams) to ensure the success of this project. We held a meeting on March 20, 2008 in which the Transcend team updated us on the infrastructure progress and we updated them on our project timeline. Provided below is a rough outline of the current timeline for infrastructure at Transcend.

- The bids are out to the city engineer for water at Transcend. They are comparing running a line off the city water line or drilling a well. Water is expected to be on site by the Fall of 2008.
- The power will be available by the end of June or early July 2008.
- A building is in the planning phase that will most likely be a metal frame shop. The building is expected to available by November 2008.
- The snow-making equipment has been selected and preliminary design is complete and will be operational November 2008.

Task 2: Laboratory Investigation (4%)

Task 2.1: Method to Rapidly Quantify Inhibitor Concentrations (10%)

The necessary information has been collected from all deicer manufacturers so that we can duplicate or develop methods to rapidly quantify the inhibitor concentration. The information was secured using non-disclosure confidentiality agreements between the deicer manufacturer and Montana State University. We are awaiting arrival of the deicer products so that testing may begin.

Task 2.2.: Method to Rapidly Quantify Corrosivity of Deicers

We are awaiting arrival of the deicer products so that testing may begin. We are also in the process of establishing Standard Operation Procedures (SOPs) for both electrochemical tests and the PNS/NACE gravimetric test.

Task 2.3.: Method to Rapidly Quantify Deicer Performance

A DSC purchased from TA Instruments is expected to arrive by April 15, 2008. Upon arrival of the DSC testing will begin.

Task 2.4.: Inhibitory Longevity under Laboratory Conditions

We are awaiting arrival of the deicer products so that testing may begin.

Task 3: Field Investigation (0%)

Task 3.1.: Inhibitor Longevity: Storage Monitoring

Task 3.2.: Inhibitor Longevity and Deicer Performance: FOTs

Task 4: Project Reporting

This is first project quarterly report. The next progress report will submitted in June 2008.

Summary of Expenditures

Table 1 below summarizes the expenditures on this project through March 31, 2008. $113,280.95 has been spent by March 31, 2008, leaving $108,178.12 for the remainder of the project fiscal year. Please note that the only one product manufacturer provided the product at no-cost plus shipping, while two product manufacturers provided the product at cost plus shipping. All other products were purchased at competitive bid prices.

Table 1: Summary of Expenditures by March 31, 2008 (The Pooled Fund budget for 1/28/08-9/28/08 is $159, 126 and the rest is funded by the WTI-UTC).

Budget Category	Budget	Spent	Remaining
Labor ($)	$59,509.87	$28,392.62	$31,117.25
Travel	$2,000.00	$364.12	$1,635.88
Operations/Communications	$400.00	$0.00	$400.00
Infrastructure start-up cost	$80,000.00	$50,738.66	$29,261.34
Contracted Testing Services	$3,500.00	$0.00	$3,500.00
Lewistown Facility Usage	$3,000.00	$0.00	$3,000.00
Corrosion Lab Testing and Other Supplies	$7,000.00	$0.00	$7,000.00
Total Direct Cost	$155,409.87	$79,495.40	$75,914.47
Indirect (42.5%)	$66,049.19	$33,785.55	$32,263.65
Total Cost ($)	$221,459.06	$113,280.95	$108,178.12

Project Schedule Summary

Table 2 details the updated project timeline, in which the duration of each task is shown by months.

Table 2: Updated Project Timeline by Month

		Calendar Year / Month																																			
		2007			2008												2009												2010								
Tasks	*Milestones*	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9
Task 0. Project Management																																					
Project kickoff*	*Oct-07*																																				
Task 1. Experiment Design and Planning																																					
Task 2. Laboratory Investigation																																					
Task 2.1. Methods to Rapidly Quantify Chloride and Inhibitor Concentrations																																					
Task 2.2. Method to Rapidly Quantify Corrosivity of Deicers																																					
Task 2.3. Method to Rapidly Quantify Deicer Performance																																					
Task 2.4. Inhibitor Longevity under Laboratory Conditions																																					
Task 3. Field Investigation																																					
Task 3.1. Inhibitor Longevity: Storage Monitoring and Cost-Benefit Analysis																																					
Task 3.2. Deicer Performance: Field Application																																					
Task 4. Project Reporting																																					
Quarterly progress reports	*End of each quarter*																																				
Draft final report	*Jul-10*																																				
Final report w/ executive summary	*Sep-10*																																				

The dashed line indicates the official start date of the project, based on when the WSDOT/PNS Pooled Fund funding was received.